

REMARKS

Claims 1, 2, and 22 have been canceled and the substance of these claims has been presented as new Claim 26, which is written to contain a positive recitation of all process steps therein. The recitation of Claim 26 in the form of the production of hydrogen and carbon dioxide is supported at page 1, lines 14-15, page 4, lines 7-9, the Examples, the description of Figures 1 and 2 in the specification, and the content of originally filed Claim 22 in step (d). Claims 3-21, 23 and 24 have been rewritten to place them in more readable form, to respond to the Examiner's rejections under 35 U.S.C. §112, and to provide proper antecedent basis in Claims 18 and 19. Claim 25 has been canceled and rewritten as new Claim 27 with a positive recitation of the process steps. New Claims 28-33 have been added to preferred embodiments. Basis for new Claims 28-32 may be found on page 9, lines 12-16, Examples 1-4 and Figures 1 and 2 and the discussion thereof in the specification. Basis for new Claim 32 may be found in Claim 20 and page 14 of the specification. Basis for new Claim 33 may be found in the citations in the specification above. No new matter has been added into the amended claims or new claims.

REQUEST FOR RECONSIDERATION

Claims 3-21, 23, 24 and 26-33 are active in the case.

The rejection of Claim 1 under 35 U.S.C. §102(b) as anticipated by, or, in the alternative, under 35 U.S.C. §103(a) as obvious over Huebler et al is traversed.

In view of the cancellation of Claim 1 this rejection is considered to be now moot.

The rejection of Claims 2-25 under 35 U.S.C. §103(a) as unpatentable over Huebler et al in view of Cole is traversed.

Huebler et al show a process of producing hydrogen alone, but does not obtain at the same time separate production of CO₂. Further, Huebler et al show in column 3, lines 10-20 that the reducing gas need only contain carbon monoxide and/or hydrogen in sufficient quantities to reduce oxidized iron solids and that the presence of other constituents, such as, methane does not affect the quality of the hydrogen produced in the oxidation step. At best Huebler et al teach the addition of methane only as an aid to the reducing system of carbon monoxide and/or hydrogen in column 7, line 75 through column 8, line 4. Huebler et al further do not teach a supplementary thermal support unit between two reaction zones which produce hydrogen and CO₂, respectively. Finally, Huebler et al is directed to a process involving the use of steam, which is not present in the process of the invention.

Cole does not remedy the deficiencies of Huebler et al, since Cole teaches only a different way to supply heat through the endothermic reaction of steam reforming CO + H₂. Cole teaches the combination in the same stage a gas-solid exothermic reaction out of the chemistry of the system (CaO + CO₂ > CaCO₃) to supply heat to the main reaction, which is endothermic, but does not describe specifically a heat transferring process, where the solid is used as a carrier of heat that is to be used in another stage of the process, as in the present invention. The fact that Cole teaches the use of a hydrocarbon as a reducing gas in a heat

transferring process for a particular use in a combustion system involving steam reforming does not teach or suggest the use of a hydrocarbon as a reducing gas in the environment of Huebler et al, which specifically directs the worker of ordinary skill in the art to carbon monoxide and/or hydrogen as the main reducing gas. Further, the reduction reactivity of methane is different from that of CO and hydrogen, and Huebler et al teaches away from the substitution of a hydrocarbon gas in place of CO and/or hydrogen.

Further, the process of Cole does not remedy the deficiencies of Huebler et al in that Cole does not produce CO₂ along with hydrogen in the same process as in the present Claims nor does Cole supply a supplementary thermal support unit between the two reaction zones and Cole, like Huebler et al, uses steam in the reaction, which is not present in the process of the claims. Thus the combination of Huebler et al and Cole can only lead the worker of ordinary skill in the art to a steam reforming process, not shown in the present Claims, which steam reforming produces hydrogen without obtaining in the same process the contemporaneous production of CO₂.

The Claims distinguish over the combination of references.

The rejection of Claims 1-25 under 35 U.S.C. §112, second paragraph as indefinite is traversed.

Applicants have made an earnest attempt to respond to all of the rejections made by the Examiner and it is submitted that the Claims now meet the requirements of 35 U.S.C. §112.

Application No. 09/810,561
Reply to Office Action of December 19, 2002

It is submitted that Claims 3-21, 23, 24 and 26-33 are allowable and such action is respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



22850

Tel: (703) 413-3000
Fax: (703) 413 -2220

A handwritten signature in black ink, appearing to read 'Norman F. Oblon', written over a horizontal line.

Norman F. Oblon
Attorney of Record
Registration No. 24,618

Roland E. Martin
Registration No.: 48,082

I:\ATTY\REM\204698US-AM.DOC